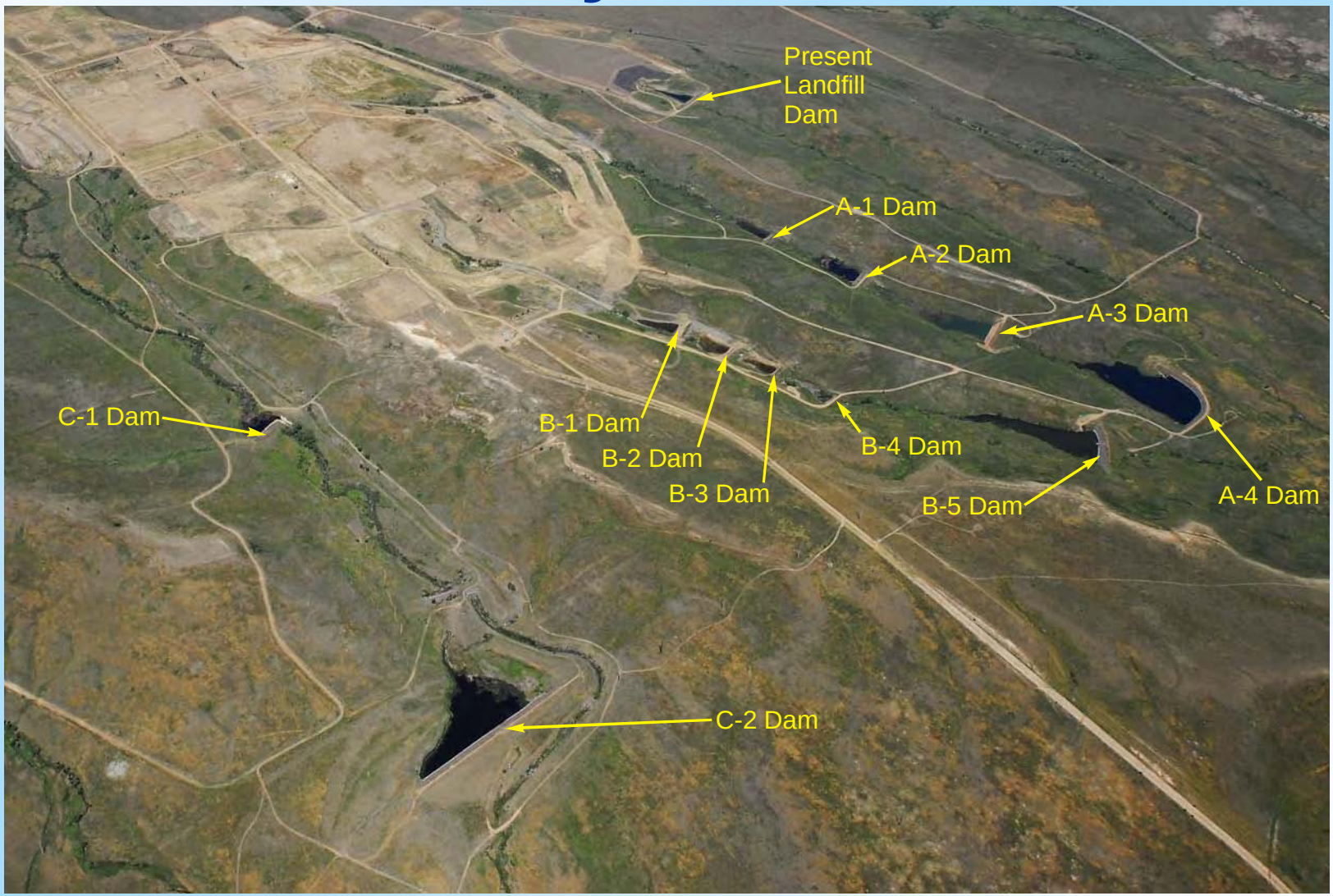
Overview of the 1st Quarter 2008 Surveillance and Maintenance Report for the DOE LM Rocky Flats Site

Rocky Flats Stewardship Council

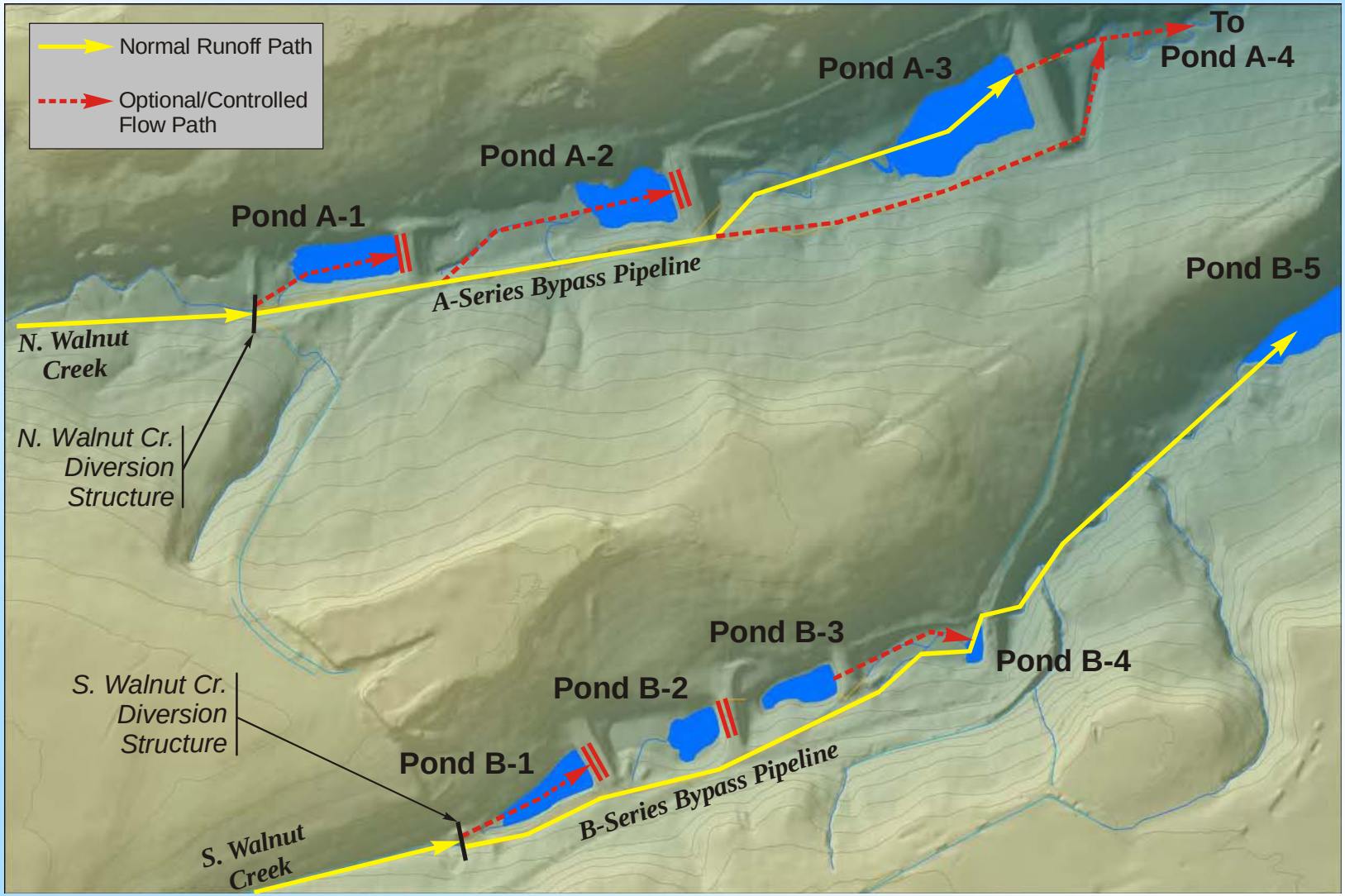
August 4, 2008

Dam Breach Projects



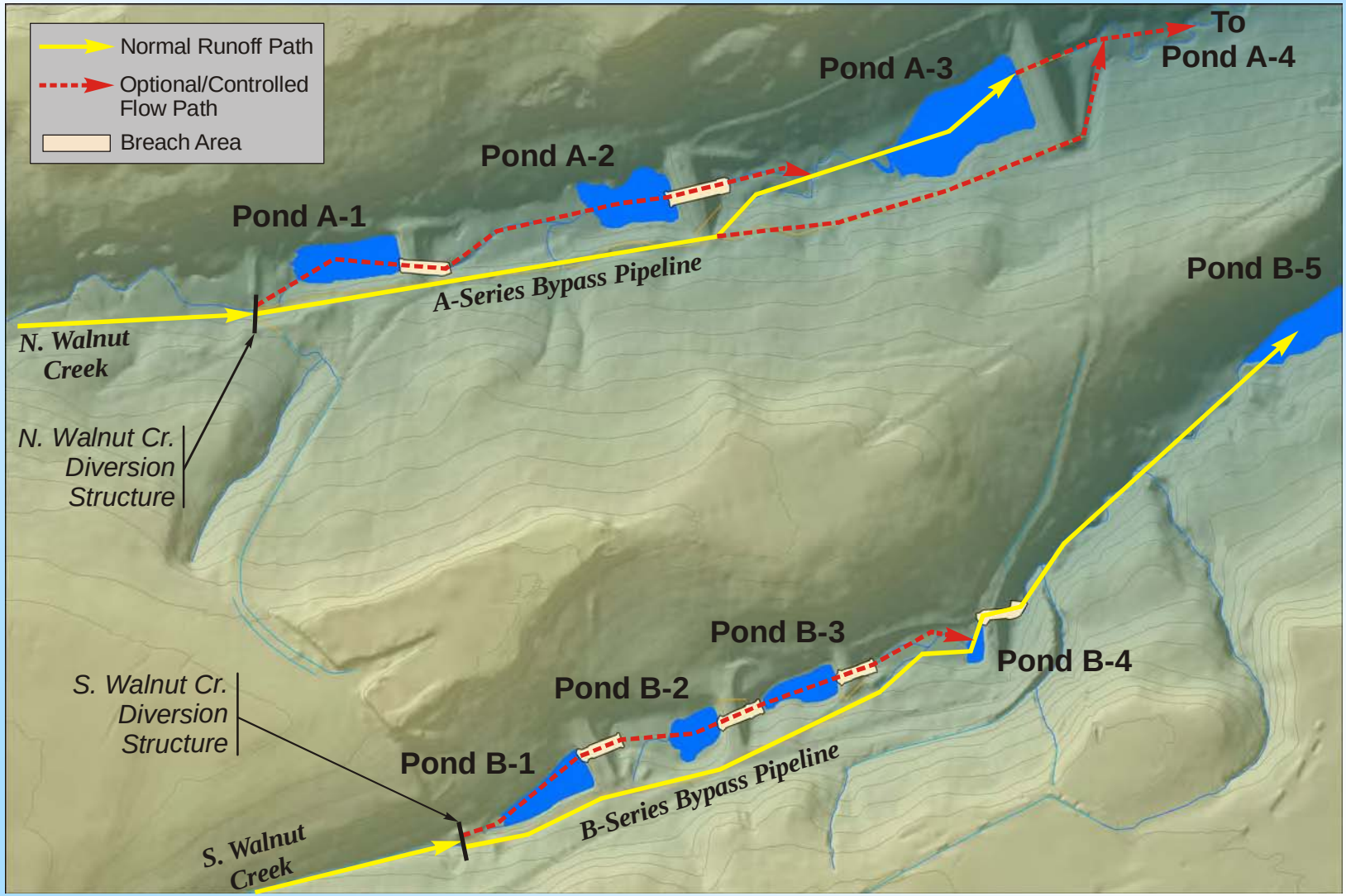
Rocky Flats Dam Locations

Dam Breach Projects (continued)



Current Water Routing Schematic

Dam Breach Projects (continued)



Post-Breach Water Routing Schematic

Dam Breach Projects (continued)

C-1 (7/4/08)

C-1 stoplog structure (2/21/05)

C-1 prior to breach (9/12/02)

C-1 breach (2/21/05)

Dam Breach Projects (continued)

- Dams A-1, A-2, B-1, B-2, B-3, and B-4
  - Mobilization 9/26/08
  - A-Series construction start 10/10/08; complete 12/15/08
  - B-Series construction start 12/16/08; complete 2/20/09
  - Project complete 3/9/09
- Dams A-3, C-2, and Landfill
  - Planning and design 2011; construction 2012
- Dams A-4 and B-5
  - Initial design 2011; final planning and design 2017; construction 2018

Breach at Dam C-1

Surface-Water Monitoring and Operations

1st Quarter 2008

Pond Operations – 1st Quarter 2008

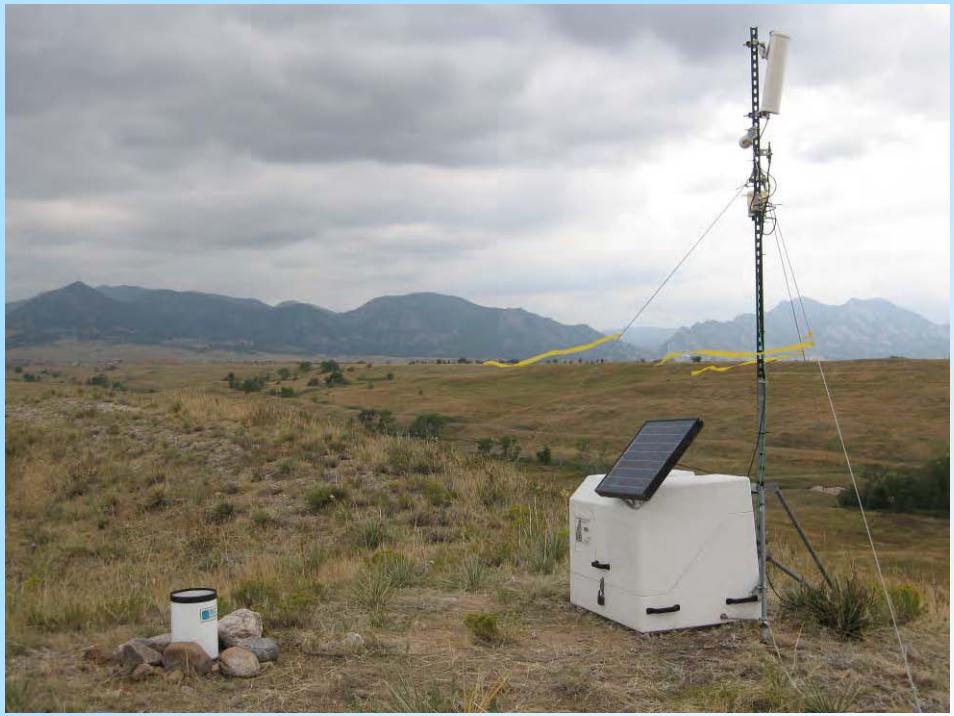
- Terminal Pond Discharges
  - None
- Transfers
  - A-3 to A-4; 3/24 to 4/15/08 (3.89 MG)
- Pond Levels
  - As of 3/31/08, Ponds A-3, A-4, B-5, C-2, and the Landfill Pond were holding approximately 18.2 MG (18.4% of capacity).

Current Pond Levels (8/1/08)

- Landfill (19.9%)
- A-3 (8.8%)
- A-4 (10.7%)
- B-5 (23.0%)
- C-2 (13.5%)

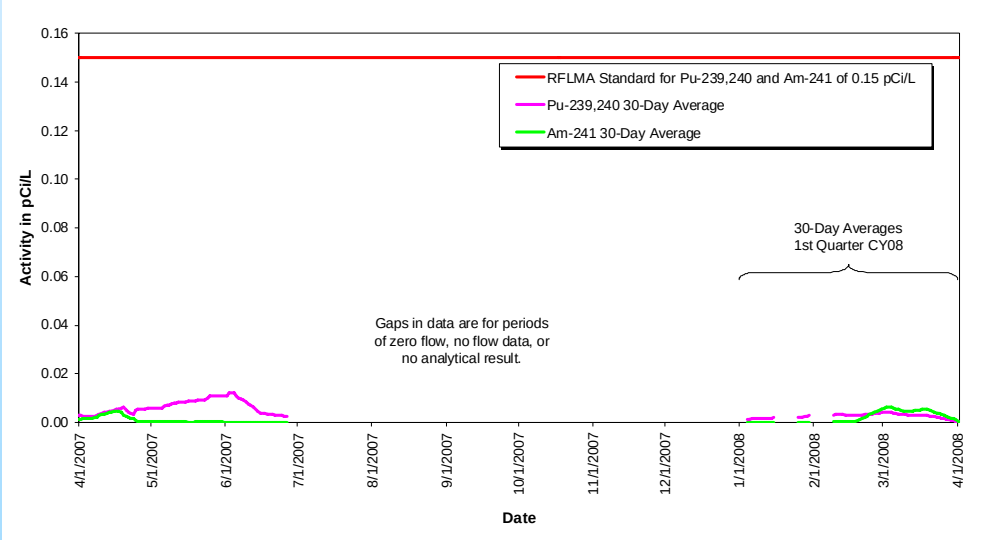
Hydrologic Data – 1st Quarter 2008

- Precipitation
  - 0.8” total precipitation
  - 59% of WY93-07 average
- Flow Rates (percent of average)
  - GS01 (38%)
  - GS03 (No Flow)
  - GS10 (21%)
  - SW027 (No Flow)
  - SW093 (18%)

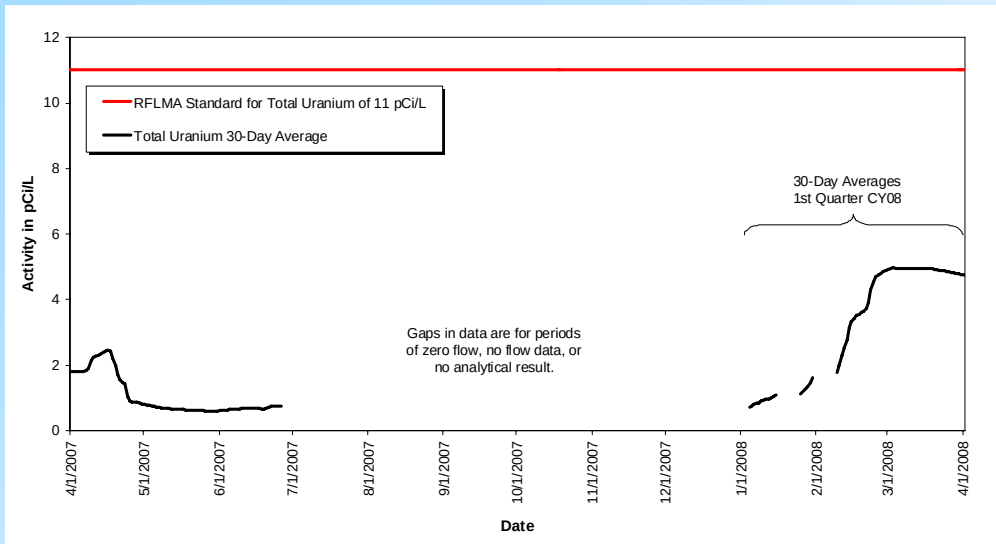


POC GS01

- Plutonium and Americium

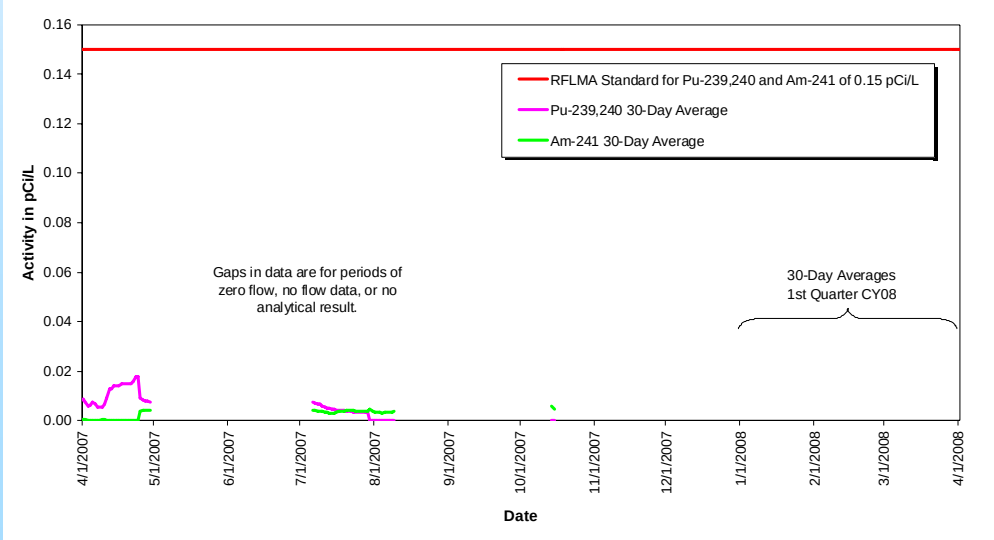


- Total Uranium

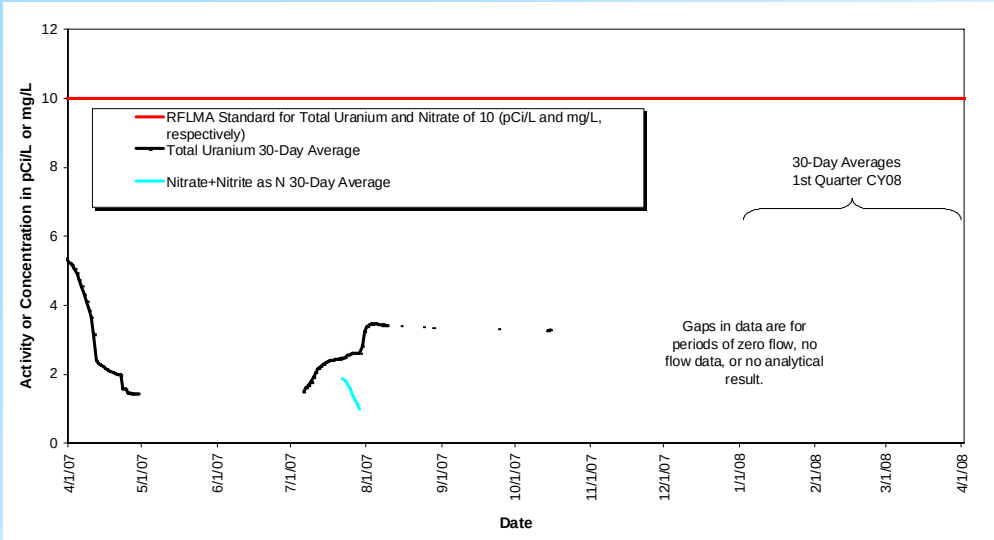


POC GS03

- Plutonium and Americium

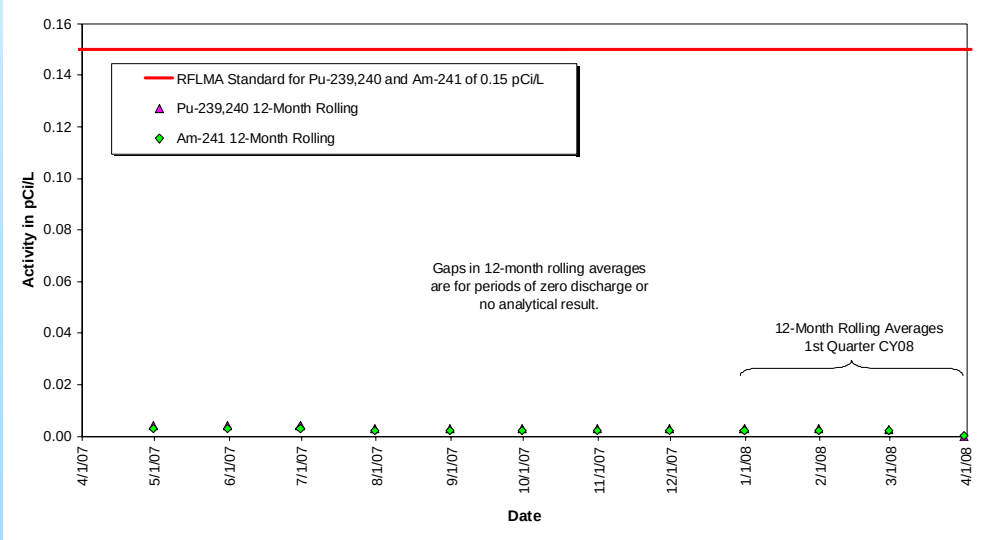


- Total Uranium and Nitrate + Nitrite as N

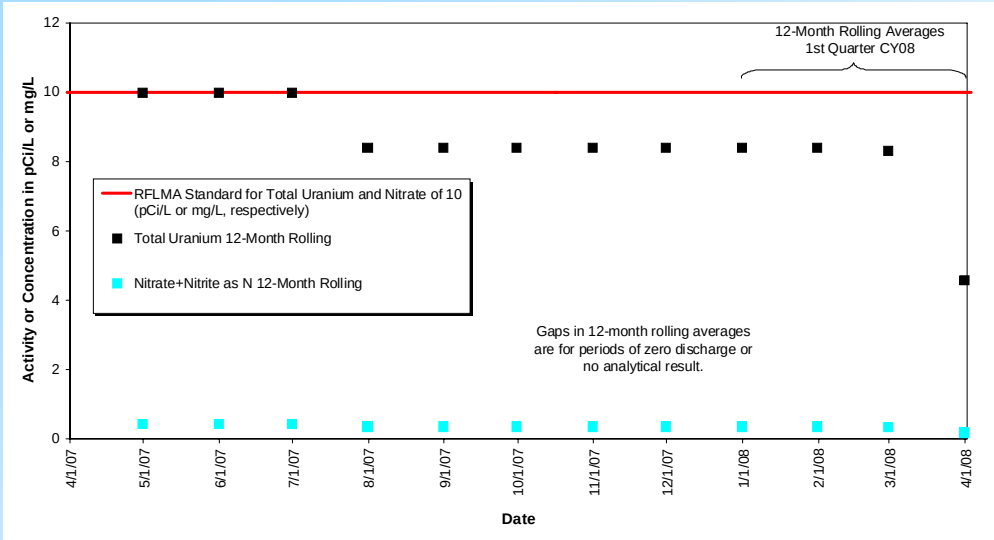


POC GS08

- Plutonium and Americium

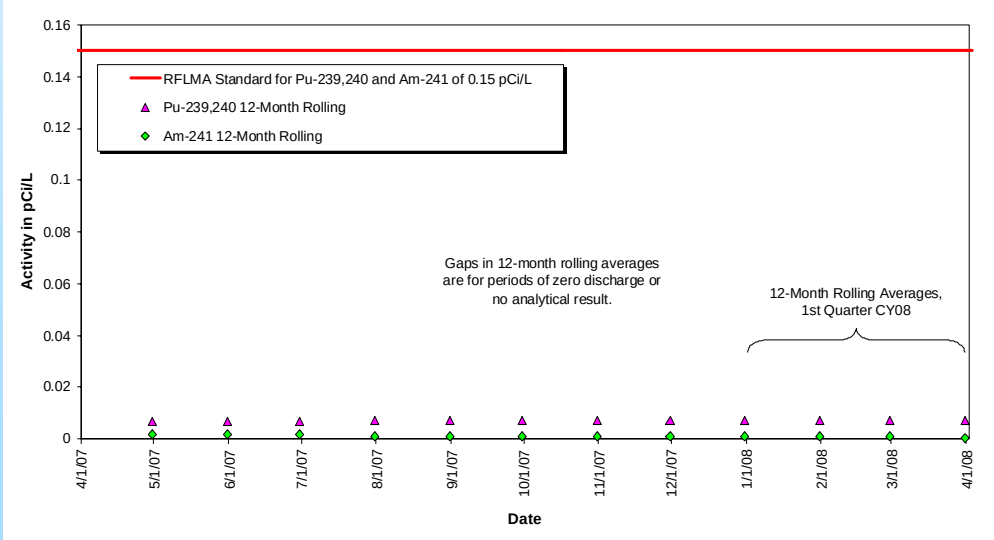


- Total Uranium and Nitrate + Nitrite as N

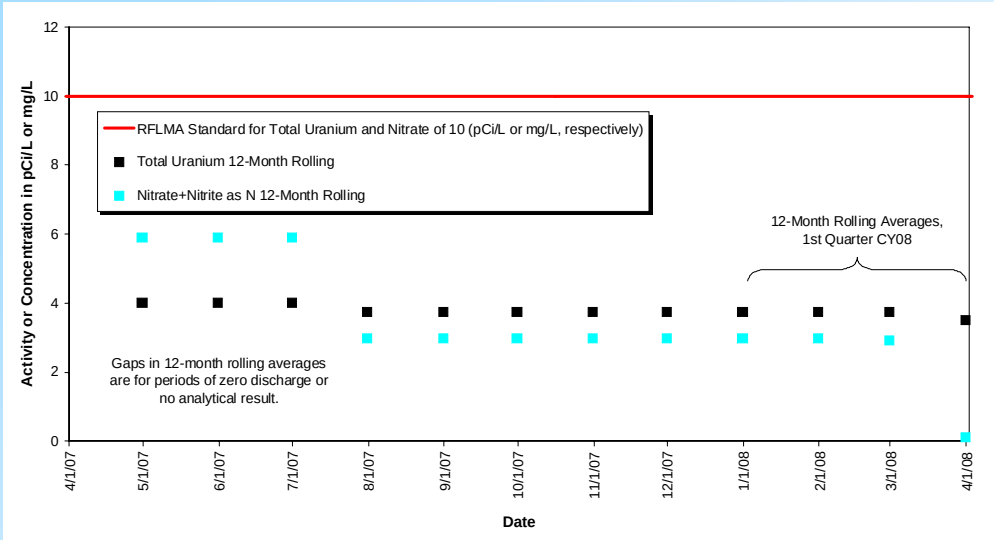


POC GS11

- Plutonium and Americium



- Total Uranium and Nitrate + Nitrite as N



POC GS31

- Plutonium and Americium

No Pond C-2 discharge during the last 12 months.

- Total Uranium

Point of Evaluation Monitoring – 1st Quarter 2008

- Water quality at all Points of Evaluation, except GS10, below applicable standards
  - Reportable values for total uranium at GS10 continue to be observed, likely caused by groundwater contributions of naturally occurring uranium to South Walnut Creek.

Performance Monitoring – 1st Quarter 2008 Original and Present Landfills

- Original Landfill: Surface-water quality results indicate remedy functioning properly.
- Present Landfill: Surface-water quality results triggered monthly sampling for dissolved silver.
  - Dissolved silver was not detected in the first monthly sample (2/26/08); monthly sampling discontinued.

Questions?

Update on WQCC Rulemaking

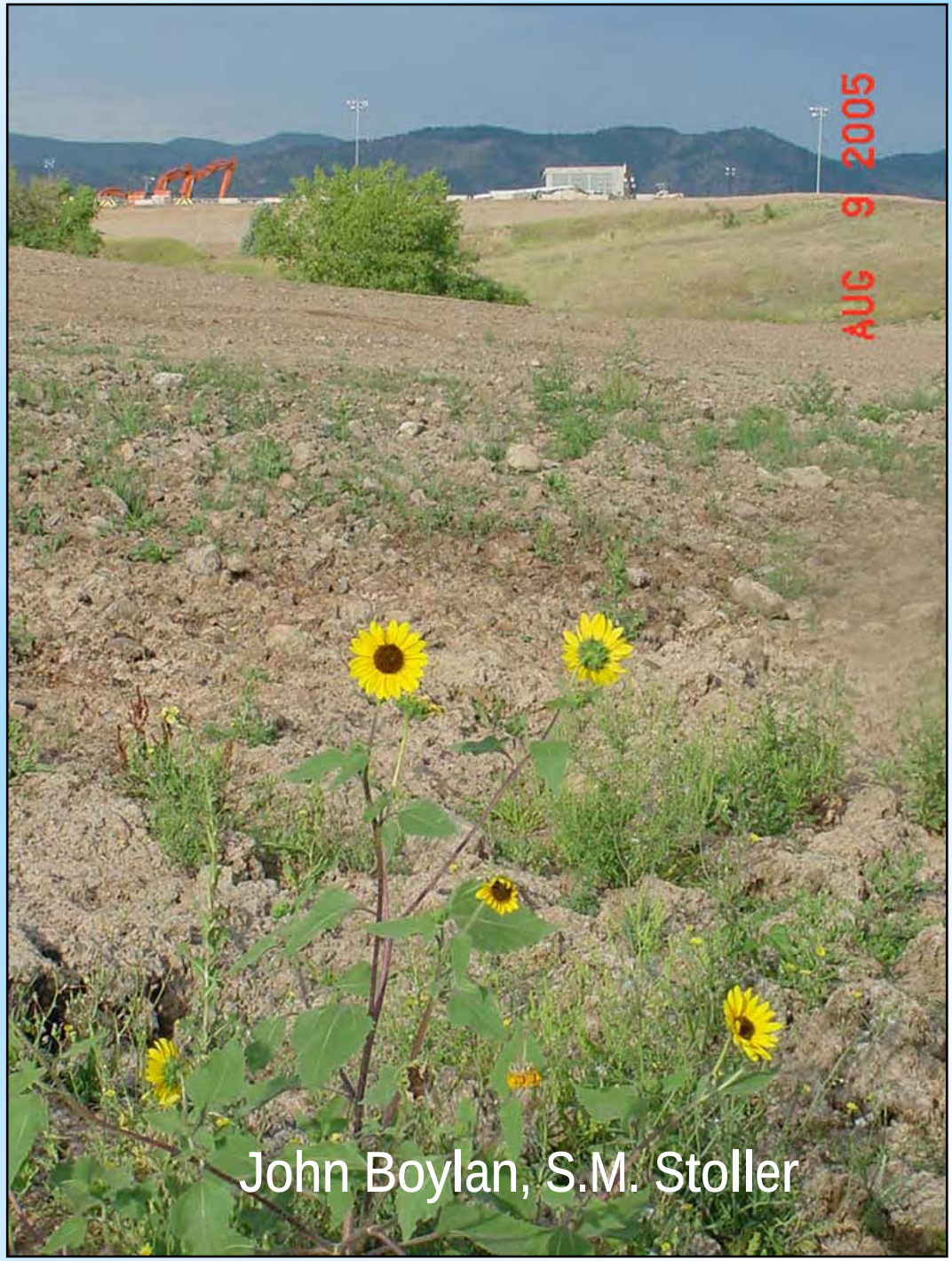
- Petition to adopt statewide basic uranium standard (MCL 30 ug/L ~ 20 pCi/L): Hearing 1/09
  - Natural uranium in groundwater now higher proportion of surface water (2007 LANL samples completed; 2008 samples collected)
  - Eliminate site-specific standards (10 pCi/L Walnut Creek; 11 pCi/L Woman Creek)
  - WQCC Hearing Notice to be published 10/10/08
- Expiring Temporary Modifications (TMs) Annual Review: Hearing 12/08
  - Current Rocky Flats TMs (6 VOCs; nitrate/nitrite) set to expire 12/31/09
  - WQCC Hearing Notice to be published 9/10/08
  - SPPTS upgrade should reduce nitrate loading to North Walnut Creek

Update on WQCC Rulemaking (continued)

- Triennial Review South Platte River Basin
  - Issues Scoping Hearing held 10/07
  - Potential Rocky Flats Issues
    - Rocky Flats TMs expire 12/31/09
    - New statewide basic standard for arsenic (10 ug/L) below site-specific standard (50 ug/L)
    - Will CDPHE adopt new EPA method for copper or other metals?
    - Uranium petition already scheduled for rulemaking
  - Issues Formulation Hearing 11/10/08; Rulemaking Hearing 6/09
  - WQCC Hearing Notice to be published 3/10/09

Groundwater Monitoring and Operations

1st Quarter 2008



John Boylan, S.M. Stoller

RFLMA Monitoring

- RCRA wells
  - Six at Present Landfill
  - Four at Original Landfill
  - All sampled successfully
  - Results generally consistent with previous
  - Will be evaluated in 2008 Annual Report

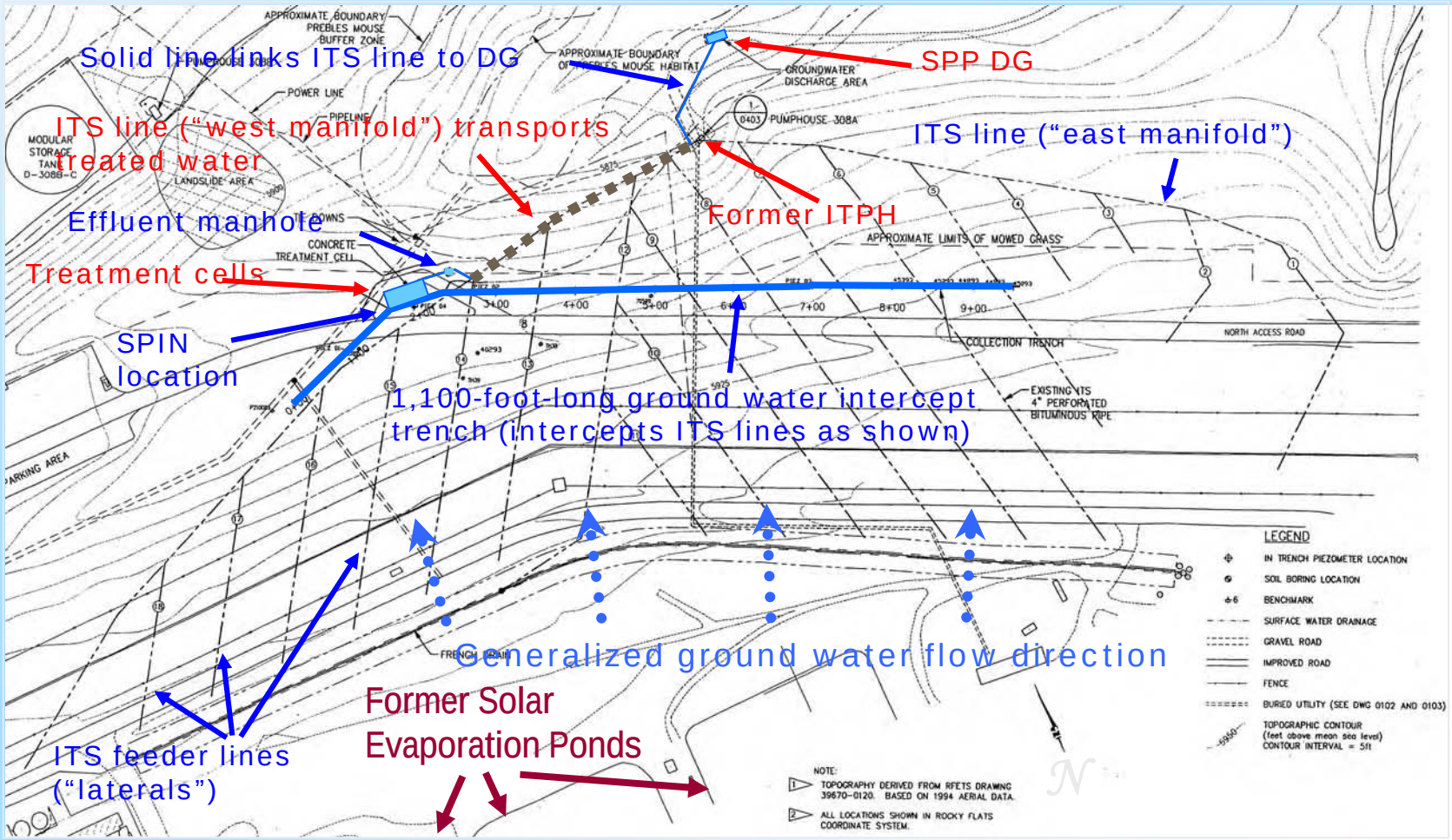
Questions?

SPPTS Update

- Interceptor Trench System (ITS) remnants are present upgradient and downgradient of SPPTS groundwater intercept trench.
- Untreated groundwater at the Discharge Gallery (DG) is from ITS remnants, as confirmed through potholing investigation in spring 2007.

SPPTS Update (continued)

SPPTS and ITS current configuration

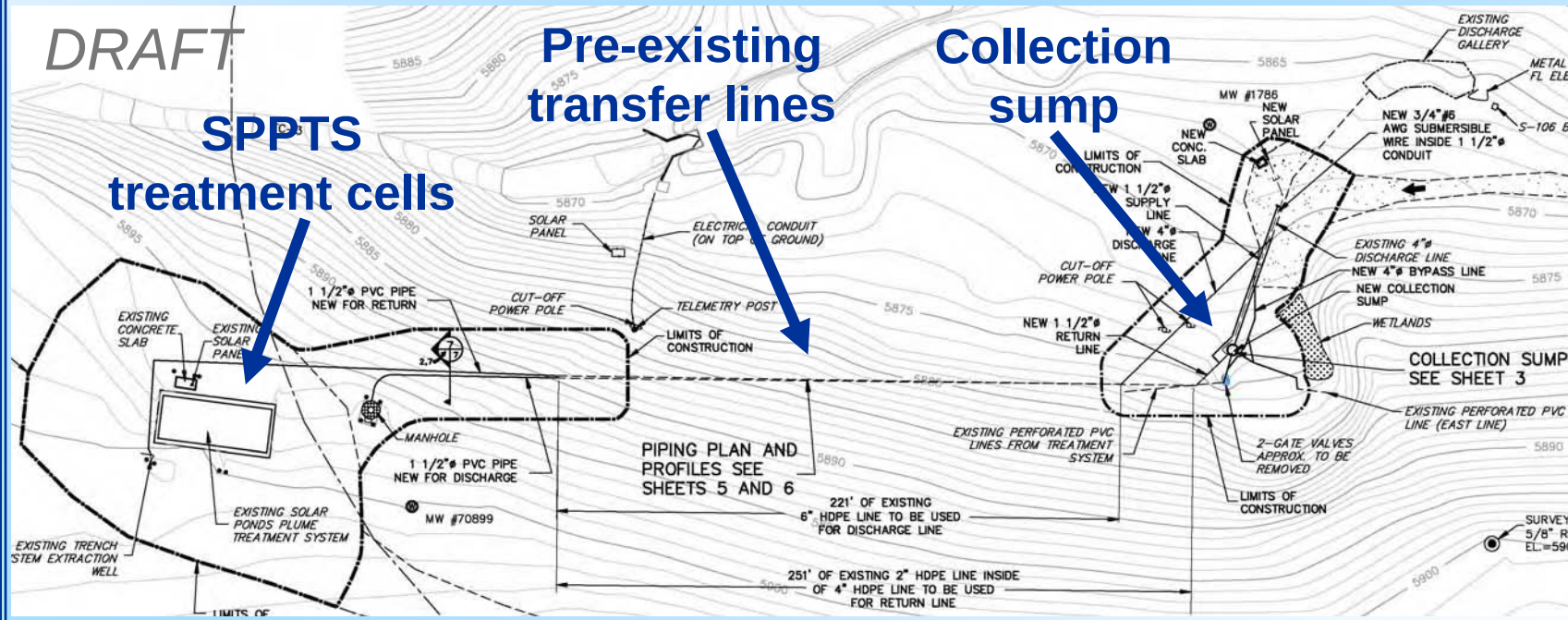


SPPTS Update (continued)

- SPPTS Path Forward
  - SPPTS improvements will be performed in phases
  - Phase I: Install collection sump (begins in August)
    - Located where ITS lines converge (near former Interceptor Trench Pump House [ITPH])
    - Collects water that is transferred (via pre-existing line) to SPPTS for treatment
    - Discharge treated water via pre-existing, un-perforated line to DG
  - Data collected following Phase I will define and inform any additional phases.

SPPTS Update (continued)

- Draft drawing showing key Phase I features



Site Operations

1st Quarter 2008

Site Operations – 1st Quarter 2008

Original Landfill – Inspections

Landfill inspections were completed on January 24, February 27, and March 31.

Vegetation inspection was completed on February 12.

Site Operations – 1st Quarter 2008 (continued)

Original Landfill – Seeps and Slumps

Seep #7 was dry for first quarter.

Seeps #4 and #8 showed active groundwater seepage throughout 1st quarter ~ 1-3 gpm.

Slumping areas of OLF continued to be monitored; no significant changes.

Site Operations – 1st Quarter 2008 (continued)

Original Landfill – Settlement Monuments

Settlement monuments were surveyed on March 6; data are within expected range per OLF Monitoring and Maintenance Plan.

Consolidation monitors were surveyed on January 3, February 4, and March 3; no significant movement.

Site Operations – 1st Quarter 2008 (continued)

Original Landfill – Geotechnical Investigation

The investigation was completed to determine subsurface conditions and the possible causes of observed localized slumping and settling of the OLF cover.

Nine test pits were excavated from February 12 – 20.

Seven boreholes were drilled beginning on March 27 and extending into second quarter 2008.

The report was issued in June 2008.

Site Operations – 1st Quarter 2008 (continued)

Present Landfill – Inspections and Surveys

The quarterly inspection was completed on February 22.

The vegetation inspection was completed on February 12.

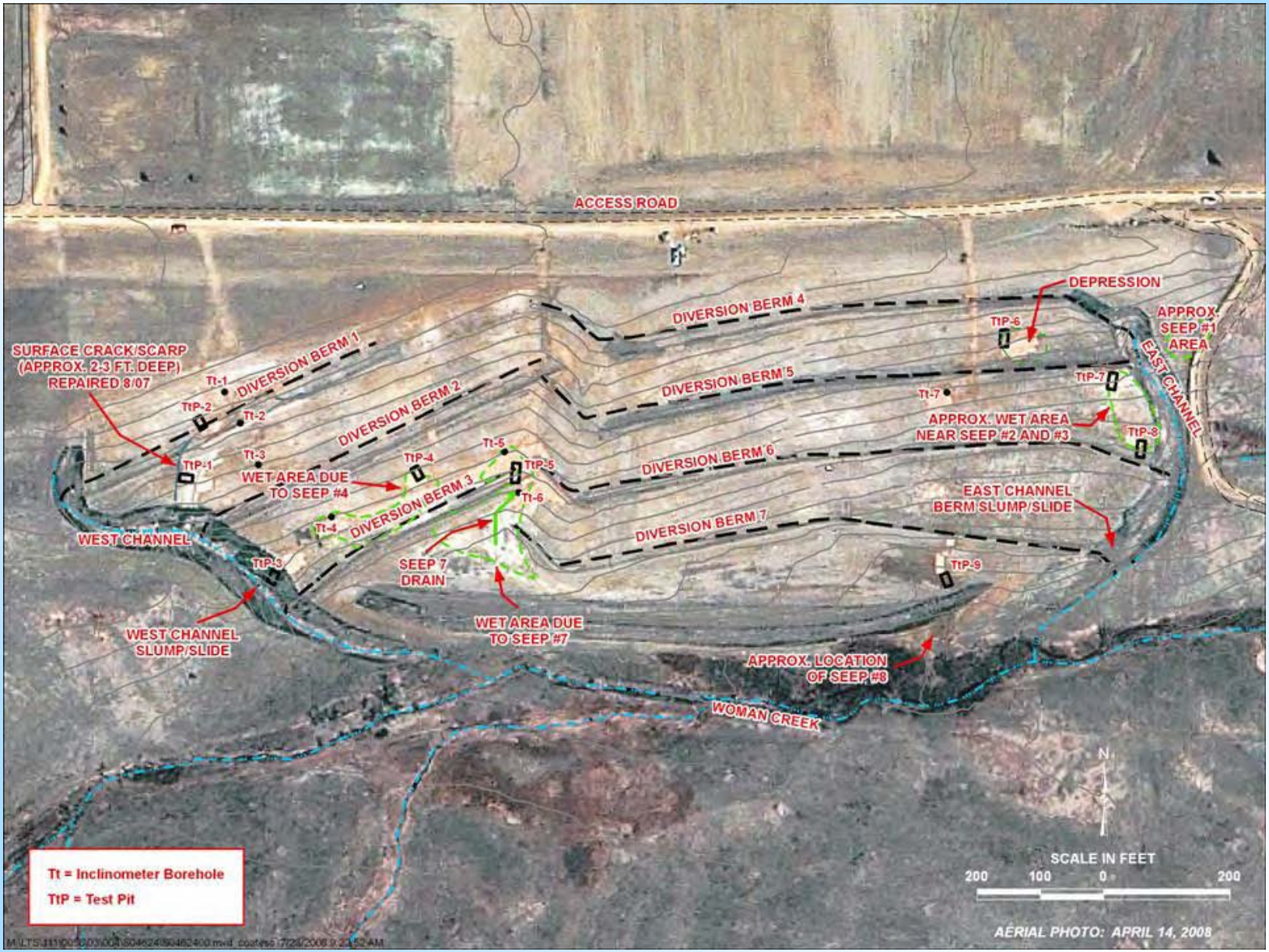
The settlement monument surveys were completed on March 6.

Questions?

Original Landfill Investigation and Path Forward

OLF Investigation – Localized Slump Areas

- 8 test pits ~ 20’ long x 11-13’ deep
  - Ninth test pit ~ 3’deep (to buttress drain depth)
- 7 boreholes ~ 28-39’ deep (into bedrock)
  - Continuous core samples
  - Inclinometers to accurately measure movement
- Clay layer with organic materials appears to be a weak interface area
  - Percolating moisture lubricates
  - Modeling predicts small-scale instability
- Buttress performing as modeled
  - No large-scale OLF instability


ACCESS ROAD
DEPRESSION
APPROX. SEEP #1 AREA
EAST CHANNEL
SURFACE CRACK/SCARP (APPROX. 2-3 FT. DEEP) REPAIRED 8/07
DIVERSION BERM 1
DIVERSION BERM 2
DIVERSION BERM 3
DIVERSION BERM 4
DIVERSION BERM 5
DIVERSION BERM 6
DIVERSION BERM 7
Tt-1
Tt-2
Tt-3
Tt-4
Tt-5
Tt-6
Tt-7
TtP-1
TtP-2
TtP-3
TtP-4
TtP-5
TtP-6
TtP-7
TtP-8
TtP-9
WET AREA DUE TO SEEP #4
APPROX. WET AREA NEAR SEEP #2 AND #3
EAST CHANNEL BERM SLUMP/SLIDE
WEST CHANNEL
SEEP 7 DRAIN
WET AREA DUE TO SEEP #7
WEST CHANNEL SLUMP/SLIDE
APPROX. LOCATION OF SEEP #8
WOMAN CREEK
N
SCALE IN FEET
200 100 0 200
Tt = Inclinometer Borehole
TtP = Test Pit
AERIAL PHOTO: APRIL 14, 2008

OLF Investigation – Seeps

- Migration of surface water from upslope areas
  - Preferential pathways and porous zones intersect ground surface
- Slope failures appear to shift pathways somewhat
  - Seep volume and occurrence change over time
- Seep #8 likely from water collected by buttress drain
  - Collected water not adequately percolating through subsurface as intended
- Directing seep water that surfaces on cover to perimeter channels/buttress drain will improve weak layer stability

OLF Investigation – Berms

- **High and low spots in channel allow minor ponding in low-flow condition.**

- **Heights below 2 feet due to minor settlement and localized slumping.**

  - **High-flow (24 hour/100 year and 1,000 year event model) condition would overtop the berms.**

OLF Path Forward

- **Repair localized slumping/differential settlement by filling/grading.**
  - **Area below Berm #1 repaired last summer with good results.**
- **Fill/regrade perimeter channel to reduce slope and improve stability at berm ends, as needed.**
- **Two-foot berm height difficult – adjust height along length based on sub-basin model.**
- **Conduct routine maintenance for observed ponding in berm channels - regrade high and low spots.**
- **Install extension to Seep #7 drain to direct water to buttress drain.**